REMARKS

Claims 2-9, 13-20, 24-31 and 35-43 are pending in the application.

I. THE OBVIOUSNESS REJECTION TRAVERSE

A. Claims 2-3, 6-9, 13-14, 17-20, 24-25, 28-31 and 35-37 are Non-Obvious Over Torkkola in view of Eriksson

The Examiner rejected claims 2-3, 6-9, 13-14, 17-20, 24-25, 28-31 and 35-37 under 35 U.S.C. 103(a) as being unpatentable over Torkkola (USP 5,959,966) in view of "Characteristic-function-based independent component analysis" in Signal Processing, October 2003, Vol. 83, No. 10 by Eriksson et al. (Eriksson). The examiner's obviousness rejection is traversed at least because Torkkola and Eriksson are not properly combined – Eriksson does not disclose anything relevant to Torkkola's disclosure. Moreover, the combination of Torkkola and Eriksson does not disclose every feature of Applicants' claimed invention.

1. Torkkola does not disclose certain claim features

Claims 2-3, 6-9, 13-14, 17-20, 24-25, 28-31 and 35-37 are non-obvious and patentable because the examiner has not made out a prima facie case of obviousness of the claims and in particular independent claims 35-37. Referring to independent claims 35-37, regarding processing signals associated with pairs of windows, the Examiner states that Torkkola teaches using a sliding window to process samples and using the separation matrix from the first window as an initial value in the second window (col. 11, line 60 - col. 2 *(sic)*, line 30). Here, Applicants take it that the reference to col. 2 is a typographical error which should be col. 12. Also in connection with claims 35-37, the Examiner goes on to indicate that using further results obtained in connection with the respective leading window to initialise independence of signals and updating independence of independence initialised signals using following window data is related to Torkkola's teaching of learning a separation matrix for a first window and using the matrix with the next window to learn the next separation matrix. In this connection the Examiner states that "The separation matrix corresponds to independence initialised signals because the signals in the matrix are separate or independent". The Examiner's understanding of Torkkola is quite wrong, and it is submitted that the Examiner has misunderstood Torkkola. This misunderstanding causes all of the rejected claims to be non-obvious and patentable.

Torkkola makes it perfectly clear that a separation matrix is NOT a set of signals produced by processing mixed signals to achieve independence initialisation, separation or independence. Instead, in Torkkola, a separation matrix is a matrix that separates or "unmixes" source signals from mixed signals – i.e. mixtures of the source signals. This is shown clearly in Torkkola at, for example, col. 5 lines 18-26 and the blind source separation (BSS) model expressed in Equation (2) repeated here for convenience:

$$u[n] = W[n]x[n] \qquad \text{Equation (2)}$$

Where x[n] is a complex valued vector of mixtures (i.e. mixed signals - col. 5, Equation (1) and lines 4-12) and noise at time instant n, W[n] is the separation matrix and u[n] is a vector of unmixed signals, i.e. separated source signals. This shows very clearly that separation matrix W[n] is completely different to the mixed signals x[n] and unmixed signals u[n].

Consequently the Examiner is clearly confusing independence initialised signals with the quite different separation matrix W[n]. Torkkola does not disclose initialising independence of signals which have previously undergone both initialisation of orthogonality using leading window results and updating of orthogonality using a following window, unlike Applicants' invention as claimed in claims 35-37. Moreover, in this connection Torkkola does not disclose a two stage process for signal independence, initialising on the basis of a leading window and updating on the basis of a following window. Torkkola simply derives the separation matrix W[n] from mixed signals x[n] without any prior orthogonality processing (col. 5 lines 25-26), then uses it to separate signals.

Applicants' independent claims 35-37 are limited broadly speaking to using leading window results to initialise signal orthogonality for a following window, and then updating this using the following window. The updated signals are then initialised as regards independence using further leading window results and updated using the following window. Consequently Applicants' invention as claimed in claims 35-37 relates to method with two separate and sequential stages each of which comprises initialisation and update, but for different parameters, orthogonality and independence respectively. Moreover, in each stage initialisation and update use different data sets (leading window results and following window). Independent claims 35-37 makes it very clear that independence is obtained only after orthogonality because the independence stage operates on results produced in the orthogonality stage.

The reason why Applicants' invention has two separate and sequential stages is explained in detail in Applicants' specification at page 13, lines 19 to 26 and page 17 line 21 to page 18 line 21: in brief, in blind signal separation (BSS) using initialisation and update steps, estimated signals are normalised to equal powers. Consequently, signals cannot be updated in decorrelation (see at 23 in Figure 3). Even if the normalisation process were to be 'undone', updating decorrelation would then undo a previous effect. Applicants' invention avoids this problem by updating the second order components and the higher order components of the unmixing matrix separately (see at 23 and 27 in Figure 3 and claim 35 paragraphs c) and e)). Torkkola does not disclose this feature of independent claims 35-37. Instead, Torkkola has only a single update step – see e.g. Equation 9 which expresses a single step for calculating an update ΔW for the unmixing or source separation matrix W. For at least this reason, the examiner has not made out a prima facie case of obviousness of independent claims 35-37 and claims 2-3, 6-9, 13-14, 17-20, 24-25, 28-31 and 35-37 are patentable.

Further regarding claims 35-37, the Examiner acknowledges that Torkkola does not teach producing orthogonality initialized signals by using results obtained in connection with the respective leading window to initialize orthogonality of signals associated with the following window and updating orthogonality of initially orthogonalised signals using following window data to produced updated orthogonalised signals. Torkkola acknowledges that it is only relevant to radio signals, whose known signal properties enable "a modified or less blind BSS process". (See col. 3 lines 21-41, lines 40-41 of Torkkola in particular). The Examiner takes the position that Eriksson teaches a Jacobi type optimization to produce independent sources and optimizing orthogonality at page 2201, Section 4 and 4.1. The Examiner regards the signals as being initially orthogonalised, justifying this by saying that orthogonality is optimized. However, Eriksson does not disclose an explicit processing step or steps of using leading window results to initialise orthogonality of signals associated with the following window. Instead, Eriksson merely uses an iterative technique of reprocessing the results of the previous iteration. (See page 2201, Section 4.1 at "2. Sweep"). Moreover, unlike paragraphs b) and c) of e.g. claims 35-37, Eriksson does not disclose updating orthogonality of initially orthogonalised signals using following window data, i.e. data not identical to that used for initialisation. Applicants' processing steps do not use the same data for initialising and updating orthogonality. In the absence of disclosure of such steps in Eriksson, the issue of whether or not Eriksson's signals are

regarded as being initially orthogonalised is irrelevant to the claimed invention. As a consequence, Eriksson does not remedy the deficiencies of Torkkola as regards absence of disclosure of initialising and updating orthogonality of signals using leading and following windows respectively. Moreover, Torkkola does not even disclose initialising and updating independence of signals using leading and following windows respectively. For these reasons as well, claims 2-3, 6-9, 13-14, 17-20, 24-25, 28-31 and 35-37 are non-obvious and patentable over the cited prior art.

Applicants' two steps of initialising and updating orthogonality lead to an important advantage - as set out in the instant specification at page 22 lines 6-14 Jacobi diagonalisation of an (m x m) symmetric matrix requires of order m^3 operations, where m is the number of signal sensors; e.g. 16 sensors would require of order 16^3 (4096) operations. Applicants' initialisation greatly reduces the number of iterations required to converge. This is an important consideration in life-critical applications such as fetal ECG monitoring where results are required in as near to real time as possible.

2. The combination of Torkkola and Erickson does not result in the claimed invention

The Examiner takes the position that it would have been obvious to one of ordinary skill to modify Torkkola's blind separation to include Eriksson's Jacobi-type orthogonal optimization, in order to minimize the objective function using computationally convenient expressions (the Examiner refers to Eriksson, p 2210, Section 4, but this appears to be a typographical error and will be taken to be p 2201). Here again the Examiner's position is wrong and is based upon a misunderstanding of what is taught by Torkkola. Quite simply, the Examiner's position is wrong because Torkkola cannot employ Jacobi type optimization because:

a) Torkkola achieves signal separation by a route which does not orthogonalise explicitly – instead signals are separated (and therefore implicitly made independent and orthogonal) by a processing route based on prior knowledge of source signal characteristics (digital RF signals, modulation scheme, symbol constellation, cumulative and probability density functions (CDF, PDF)): there is no suggestion in Torkkola whatsoever regarding any need for orthogonalisation, i.e. with Jacobi or otherwise; consequently one of ordinary skill reading Torkkola has no motivation for searching for Eriksson or for implementing Jacobi; and

b) Torkkola does not mention an objective function or its minimisation, so Torkkola does not disclose explicitly anything to which Jacobi can be applied: instead at multiple points in the text Torkkola uses the concepts of information maximisation and maximum likelihood, i.e. the opposite of minimisation.

The combination of Torkkola and Eriksson does not result in the claimed invention for each of the reason recited above and claims 2-3, 6-9, 13-14, 17-20, 24-25, 28-31 and 35-37 are, therefore, non-obvious and patentable.

In summation, the Examiner's rejection of independent claims 35-37 and related dependent claims 2-3, 6-9, 13-14, 17-20, 24-25 and 28-31 for obviousness is traversed on the following five different grounds:

1. A separation matrix is NOT a set of signals produced by processing mixed signals to achieve independence initialisation, separation or independence, and such a matrix does not therefore correspond to Applicants' claims 35-37 paragraphs d) and e). Torkkola therefore does not disclose independence initialisation and independence updating of signals on the basis of leading and following windows respectively;

2. Torkkola does not disclose using different data windows in connection with initialising and updating independence of signals respectively, the signals having previously undergone two steps of initialising and updating orthogonality on the basis of different data windows also;

3. Eriksson does not remedy the deficiencies of Torkkola as regards absence of disclosure of initialising and updating orthogonality on the basis of leading and following windows respectively. Torkkola and Eriksson in combination therefore do not anticipate Applicants' invention as claimed in claims 35-37;

4. Torkkola achieves signal separation without an explicit orthogonalisation step so Eriksson's Jacobi is unnecessary; and

5. There is nothing explicitly disclosed in Torkkola which Jacobi can replace or to which Jacobi can be applied without redundancy, and there is therefore no motivation in Torkkola for one of ordinary skill to seek Eriksson: Torkkola and Eriksson are therefore not properly combined.

3. Torkkola and Eriksson are not property combined

In order to make it abundantly clear that Torkkola and Eriksson are not properly combined, Torkkola's processing will now be discussed in more detail. The following Torkkola teachings are relevant:

- Torkkola's Equations 1 and 2 (col. 5 lines 6 and 21) define models of mixing and separation in which quantities such as W[n] (separation matrix) and u[n] (separated source signals) will be derived later.
- Torkkola mentions that learning the separation matrix can be based on the criterion of maximising "information at the output passed through non-linear functions which model the cumulative density function (CDF) of the source signals" (col. 5 lines 27-38). Torkkola's Equations 3 and 4 (col. 5 lines 46 and 51) define a non-linear function G(z)

which models the source signals' CDF and a corresponding probability density function (PDF) g(z).

- At col. 6 lines 4-11, Torkkola summarises the procedure to derive Adaptation Equation 9 which gives the matrix increment or adaptation ΔW in terms of the separation matrix W: this procedure selects the blind source separation (BSS) model (e.g. information maximisation or maximum likelihood) which takes account of source signal PDF, and inserting an approximation of the PDF into the BSS model. Derivation of Adaptation Equation 9 begins with the Equation 5 expression for ΔW and W using the natural gradient.
- In col. 6 line 28, a non-linear function is defined, a hyperbolic tangent $y_i = \tanh(w(|u_i| - 1))$ which approximates the CDF of the data: this function is inserted into the information maximisation adaptation equation to provide Equation 7: after algebraic manipulation this becomes Adaptation Equation 9, col. 6 line 51. This equation (or similar) is later derived by other routes – see Equations 15, 20 and 21 at col. 8 line 47, col. 9 line 62 and col. 10 line 40 respectively.
- At col. 10 lines 15-23, and at step 16 in Figure 1, Torkkola discloses learning the separation matrix W by applying the Adaptation Equation 9, 15 or 20 to the mixed signals and adjusting weights. Since the Adaptation Equation expresses the matrix increment or adaptation ΔW in terms of the separation matrix W itself, W requires an initial value such as a unit matrix. Col. 12 line 24-28 gives an alternative initial value of W comprising a previous value of W obtained from earlier data. Col. 10 lines 26-28 discloses computing ΔW over 10-500 samples of the mixed signals.
- At col. 10 lines 47-50, and at step 18 in Figure 1, Torkkola discloses multiplying the mixed signals by the separation matrix W (derived from Adaptation Equation 9, 15, 20 or 21) to produce at least one source signal.

Applicants now turn to the Examiner's contention that it would have been obvious to one of ordinary skill to modify Torkkola's blind separation to include Eriksson's Jacobi-type orthogonal optimization, in order to minimize the objective function using computationally convenient expressions (Eriksson, p 2201, Section 4). In the response to the previous official action, Applicants asked the Examiner to specify clearly the Torkkola equation to which the Examiner envisages applying Eriksson's Jacobi or which is replaced by Jacobi and why. The Examiner has not done so, stating that "the claims do not contain any limitations to specific equations". However Applicants submit that claim limitations are not relevant to the point at issue here: i.e. the Examiner contends that it is obvious to combine Torkkola with Eriksson, despite there appearing to be no rational basis for doing so. The Applicant contends that Torkkola cannot be combined with Eriksson to achieve the claimed invention. It is therefore for the Examiner to clarify how Torkkola can be combined with Eriksson to achieve the claimed invention. The issue of combining Torkkola with Eriksson is discussed below in more detail.

The Applicant believes that there are two possible ways of combining two references such as Torkkola and Eriksson. One reference may replace part - but not all - of the other (were it to replace all there would be no combination). Alternatively one reference may be used as well as the other. In the present case Eriksson cannot replace part of Torkkola's Adaptation Equations because there is nothing which can usefully be replaced and Torkkola would be made unworkable. Moreover, Eriksson cannot be used to transform Torkkola's Adaptation Equations because they are not signals to which Jacobi is applied. Finally, Eriksson cannot be used as well as Torkkola's Adaptation Equations because no apparent benefit results.

In this regard, Torkkola's Adaptation Equations 9, 15, 20 and 21 are all derived using a non-linear function G(z) which models the source signals' cumulative density function (CDF) and a corresponding probability density function (PDF) g(z) – see e.g. Adaptation Equation 9 derived in col. 5 line 27 to col. 6 line 52. Although of course they contain expressions such as u_i for signals, these adaptation equations were derived WITHOUT and therefore do not contain actual data in the form of source signals or mixed signals. Eriksson's Jacobi is applied to signals, not to equations or other algebraic expressions – see Eriksson, p 2201, Section 4.1 at "2. Sweep", which discloses signals rotated in pairs. Consequently Eriksson's Jacobi cannot be applied to these adaptation equations because they are algebraic expressions, not signals.

Eriksson's Jacobi cannot replace Adaptation Equation 9, 15, 20 or 21, because this results in Torkkola being replaced completely by Eriksson. Torkkola has nothing other than these adaptation equations to apply to signals. Consequently, using Eriksson's Jacobi to replace Adaptation Equation 9, 15, 20 or 21 means that Torkkola completely vanishes and is therefore not combined with Eriksson.

The Examiner's justifies introducing Eriksson's Jacobi is in order to "minimize the objective function using computationally convenient expressions" (Eriksson, p 2210, Section 4). If there is in Torkkola an equivalent of an objective function to be minimized using computationally convenient expressions, it would be embodied perhaps implicitly in Adaptation Equation 9, 15, 20 or 21, to which Eriksson's Jacobi cannot be applied as has been said.

It might be envisaged that Eriksson's Jacobi could replace one or more individual expressions in Adaptation Equation 9, 15, 20 or 21. If so, the Examiner has not stated what they are? In this regard Adaptation Equation 9 reads as follows (with similar expressions for the other equations):

$$\Delta W \propto \left(1 - 2\left(\frac{w_i \tanh(w_i(|u_i| - 1))u_i}{|u_i|}\right)_i u^H\right)W \qquad \text{Equation 9}$$

where ΔW is the matrix increment or adaptation being computed to the separation matrix W, w_i is a parameter controlling the sharpness of the hyperbolic tangent tanh(…) (col. 5 lines 55-57), $()_i$ denotes the ith element of a vector, u denotes a signal and index H a hermitian conjugate – see col. 6 lines 12-60.

Each of Torkkola's Adaptation Equations represents a single processing step for calculating a single increment ΔW for the separation matrix W, which is subsequently applied to mixed signals to unmix or separate them. Calculation of ΔW is not a series of processes one of which can be replaced by an alternative from another reference. Each of Torkkola's Adaptation Equations is therefore a package deal which is implemented in whole or not at all. Applicants therefore submit that none of the parameters or expressions (such as the tanh(..) function) in Adaptation Equation 9 can be replaced by Eriksson's Jacobi, nor can Eriksson's Jacobi be applied to Equation 9 itself.

It might be envisaged that Eriksson's Jacobi could be applied to signals as well as Torkkola: there appear to be only four possibilities for this, i.e. applying Jacobi:

a) to the mixed signals prior their use to derive the separation matrix W; W is then derived from Jacobi orthogonalisations of the mixed signals not the mixed signals themselves; or

b) to the mixed signals prior to applying W to them to separate source signal(s): W is then derived from mixed signals but applied to orthogonalised signals; or

c) a) and b) combined, so that the separation matrix W is both derived from and applied to orthogonalised mixed signals; or

d) to separated source signal(s) derived by applying W to the mixed signals: this means that the separated source signal(s) undergo an additional and it would seem quite purposeless orthogonalisation, because separation of the source signals has already (implicitly) orthogonalised them otherwise they would not be separated.

Absent the hindsight afforded by reading Applicants' specification, there is no suggestion in or inference to be drawn from Torkkola whatsoever that any of a) to d) above would be beneficial: consequently one of ordinary skill reading Torkkola would receive no motivation for searching for Eriksson or for implementing Jacobi. Furthermore, if one of ordinary skill were to use

Eriksson and Jacobi, he or she might much more reasonably forget about Torkkola completely and use Eriksson alone – Torkkola does not disclose or even suggest any need to use both.

The Examiner's justification for introducing Eriksson's Jacobi is in order to "minimise the objective function using computationally convenient expressions" – which implies replacing some unspecified part of Torkkola. However, not one of the possibilities a) to d) above achieves that goal. The possibilities merely introduce extra processing without necessarily any countervailing benefit. Moreover, of these possibilities, a) and b) do not appear to be appropriate because either the matrix W is not derived from mixed signals or it is not applied to mixed signals, contrary to the disclosure in Torkkola; possibility c) introduces two extra processing steps without any benefit it would appear, because it appears to amount to orthogonalising what is going to be orthogonalised by W anyway; and d) appears to be without purpose, because it appears to amount to orthogonalising what has already been orthogonalised. Consequently, a) and b) do not appear to be appropriate and c) and d) appear to be redundant – there is no disclosure in Torkkola to contradict this.

Furthermore, Jacobi diagonalisation is computationally expensive – it requires of order m^3 operations to diagonalise an (m x m) symmetric matrix: extra processing as per any of a) to d) above is most unattractive, particularly in the absence of disclosure of any resulting benefit. it is an objective of Applicants' invention to minimise processing, not increase it to no purpose.

Applicants therefore respectfully submit that Torkkola and Eriksson are not properly combined because it is not possible to do so and claims 2-3, 6-9, 13-14, 17-20, 24-25, 28-31 and 35-37 are, therefore non-obvious. If, despite the above discussion, the Examiner continues to combine Torkkola and Eriksson, Applicants once more respectfully request the Examiner to state in detail how they are to be combined to achieve the claimed invention. A mere hand-waving statement that they are to be combined in some unspecified way makes it impossible for the Applicant to meaningfully respond to the examiner's patentability position.

Turning now to claims 2, 13 and 24, the Examiner acknowledges that Torkkola does not teach updating orthogonality using small updates to produce decorrelation in a second order statistics procedure. Eriksson is cited to teach Jacobi optimization to produce independent sources and optimizing orthogonality. However, as previously discussed there is no explicit disclosure of anything in Torkkola to which Jacobi can usefully be applied, so one of ordinary

skill in the art would have no motivation for searching for Eriksson and nothing to which to apply Eriksson even if found.

As regards claims 3, 14 and 25, there is no matrix in Torkkola which can usefully be diagonalised, so here again one of ordinary skill in the art has no motivation for searching for Eriksson and nothing to apply Eriksson to even if found. In this regard the only matrices which Torkkola discloses are the separation matrix W and (perhaps) its increment ΔW, neither of which require diagonalisation.

With reference to claims 6, 17 and 28, the Examiner states that Torkkola teaches removing the components of other mixed signals to recover a source signal (col. 4, lines 1-12): Applicants do not understand the relevance of this statement. Claims 6, 17 and 28 are not concerned with removing components of mixed signals: they are instead concerned with processing only desired signals in a phase subsequent to acquisition; i.e. it is unwanted <u>separated</u> signals which are removed from later processing after they are identified in the acquisition phase, not mixed signal components. In this regard please note Applicants' specification at page 29 lines 10-25, where there are eight traces of separated signals 61 to 68, of which the fetal ECGs are 61 and 65. If only the fetal ECGs are required, signals 62-64 and 66-68 could be dropped reducing the processing burden by 75%. Neither Torkkola nor Eriksson disclose this.

Regarding claims 7, 18 and 29: Torkkola's separation matrix (col. 11, line 60 - col. 12, line 30) is not disclosed to be a statistical measure of data. This matrix is therefore not relevant to claims 7, 18 and 29.

In connection with claims 8, 19 and 30, the Examiner observes that Torkkola teaches using a sliding window to process samples and using the separation matrix from the first window as an initial value in the second sample window. However, that is not the subject matter of claims 8, 19 and 30, which relate to the embodiment described Applicants' specification at page 38 lines 9-27: this embodiment processes data "snapshots" (a snapshot = one sample from each of a set of sensors) to update preceding results iteratively so that one does not have to recompute using a whole window of data in response to one new snapshot. Instead the snapshot is processed and the result used as an update. This is quite different to Torkkola, who uses a whole window of data to compute the separation matrix W: see col. 12 lines 15-16 "learning a first separation matrix from the 80 samples", and lines 19-21: "A second separation matrix is learnt from the 80 window sample *(sic)*"; here "80 window sample" should presumably be "80 sample

window". A separation matrix may be used as a starting point to calculate the next matrix as per col. 12 lines 24-27, but Torkkola still computes the next matrix over a whole window of data, unlike Applicant's invention as claimed in claims 8, 19 and 30.

Turning now to claims 9, 20 and 31, Torkkola teaches precisely the opposite of what is claimed: i.e. Torkkola teaches counteracting the effects of signal fading, whereas Applicants' invention actually introduces signal fading artificially by using a forget factor to weight results in favour of more recent data.

B. Claims 4-5, 15-16 and 26-27 Are Non-Obvious And Patentable

The Examiner next rejected claims 4-5, 15-16, and 26-27 under 35 U.S.C. 103(a) as being unpatentable over Torkkola in view of Eriksson as applied to claims 3, 14 and 25, which Applicant respectfully traverses for reasons given above, and further in view of US Patent Application Publication 2001/0044719 to Casey (Casey).

The Examiner states that Torkkola and Eriksson teach all the limitations of claim 3 upon which claims 4 and 5 depend, claim 14 upon which claims 15 and 16 depend and claim 25 upon which claims 26 and 27 depend. This is respectfully traversed for the reasons given above; e.g. neither Torkkola nor Eriksson nor their combination discloses all the features of claims 35, 2 and 3 from which claim 4 depends, and similar remarks apply to claims 14 and 25.

Regarding claims 4, 15 and 26, the Examiner states that Torkkola and Eriksson do not teach higher than second order statistics: this is not correct. It is true that there is no explicit reference to higher than second order statistics in Torkkola, but in fact the hyperbolic tangent function tanh(…) in e.g. Adaptation Equation 9 (see above) provides for Torkkola to incorporate higher than second order statistics.

The Examiner points out that Casey paragraph 39 teaches "a contrast function being defined on cumulative expansions up to a fourth order". The Examiner goes on to state that it would have been obvious to one of ordinary skill to modify the combination or Torkkola and Eriksson, to include Casey expansions up to the fourth order. The Examiner justifies this by saying features would have been extracted from recorded signals (Casey paragraph 39). However, Torkkola and Eriksson already extract features from signals, because they both separate source signals from mixtures. (Torkkola in e.g. col. 10 lines 47-50 and Eriksson page 2201 Section 4.1). Casey is therefore redundant because its function and higher than second order statistics are already achieved by a different route, and there is therefore no motivation for

one of ordinary skill to consider Casey for any reason. Moreover, neither Torkkola nor Eriksson explicitly discloses a contrast function, so they cannot employ "a contrast function defined on cumulative expansions up to a fourth order" as per Casey paragraph 39.

Regarding claims 5, 16 and 27, the remarks of the immediately preceding paragraph apply once more with "higher than second order" replaced by "third or fourth order".

In Applicants' arguments filed 6 February 2008, Applicants stated that Torkkola is totally useless for the application described in Applicants' specification to fetal ECG monitoring because the parameters which are known in Torkkola (modulation scheme, the symbol constellation and the baseband source signals' probability density function) are not known in fetal ECG monitoring. The Examiner responded that the claims do not contain any limitations directed to fetal ECG monitoring: this is beside the point – unlike Torkkola, Applicants' invention is applicable to separation of signals with unknown parameters, one example being fetal ECG signals but there are many others (e.g. electroencephalograph (EEG) signals which have a different structure to that of fetal ECG).

II. THE ALLOWABLE SUBJECT MATTER

The Applicant acknowledges the examiner's allowance of claims 38-43 in the April 30, 2008 Office Action.

CONCLUSION

All pending application claims are believed to the patentable for the reasons recited above. Favorable reconsideration and allowance of all pending claims is, therefore, courteously solicited.

McDonnell Boehnen Hulbert & Berghoff LLP

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By: /A. Blair Hughes/
A. Blair Hughes
Reg. No. 32,901

(312) 913-2123